N.S.W. DEPARTMENT OF AGRICULTURE.

BIOLOGICAL BRANCH - DIVISION OF SCIENCE SERVICES.

P L A N T D I S E A S E S U R V E Y.

for the

TWELVE MONTHS ENDING 30th JUNE, 1956.

TWENTY-SIXTH ANNUAL REPORT.

Notes compiled by officers of the Plant Pathological Section of the Biological Branch, New South Wales Department of Agriculture, Sydney, Australia.

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COMMONWEALTH MYCOLOGICAL INSTITUTE
8 FEB 1957

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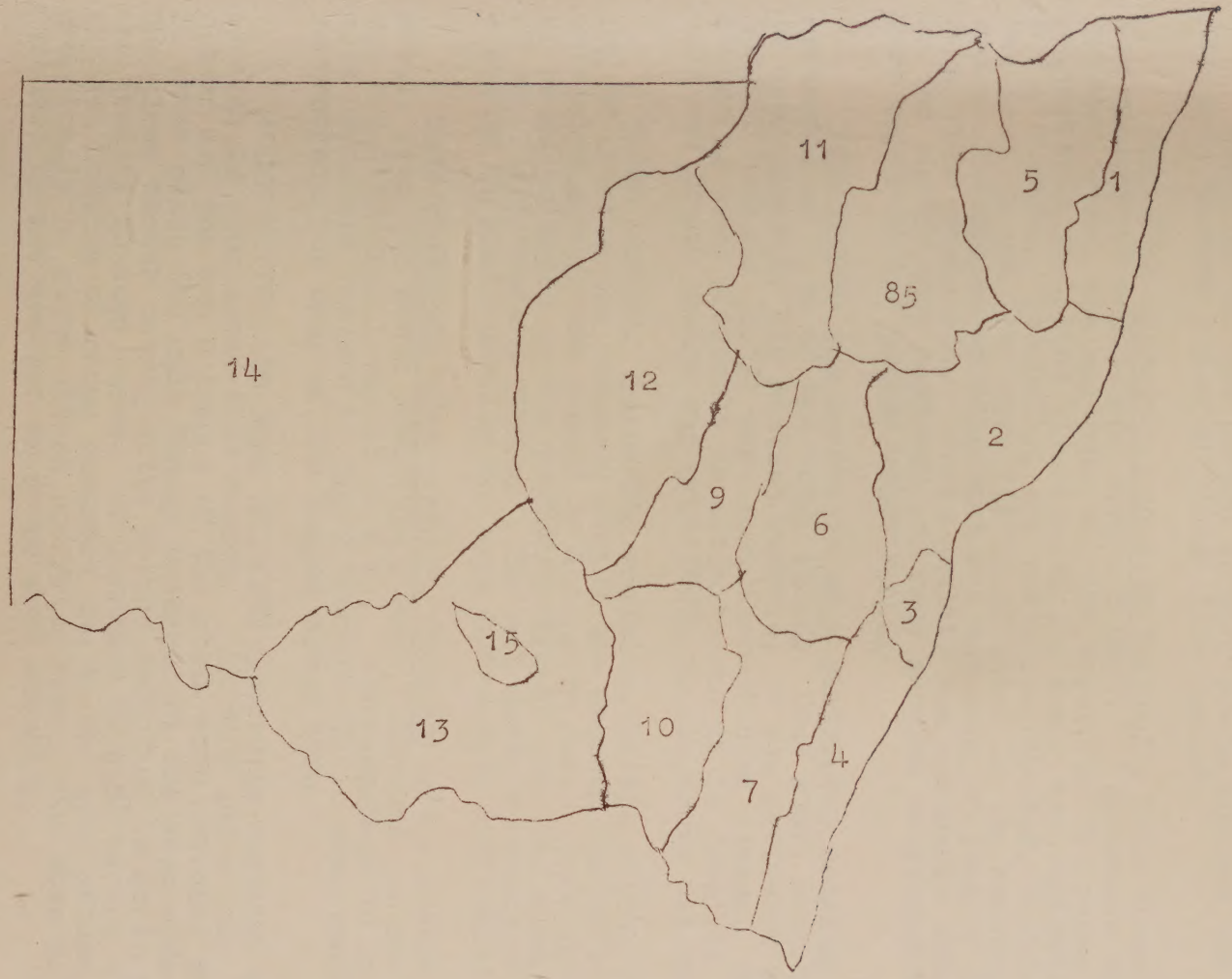

KEY.

1. North Coast (N.C.)
2. Central Coast (C.C.)
3. Metropolitan Area (M.A.)
4. South Coast (S.C.)
5. Northern Tableland (N.T.)
6. Central Tableland (C.T.)
7. Southern Tableland (S.T.)
8. North Western Slope (N. W.S.)
9. Central Western Slope (C.W.S.)
10. South Western Slope (S.W.S.)
11. North Western Plain (N.W.P.)
12. Central Western Plain (C.W.P.)
13. Riverina (R)
14. Western Division (W.D.)
15. Murrumbidgee Irrigation Areas (M.I.A.

CEREALS.

Rust diseases caused severe damage to wheat and oat crops this season, reducing yields and affecting grain quality to such an extent that many loads were much below F.A.Q. Glume and stem diseases of wheat caused by Septoria nodorum were also favoured by the wet season and foot rot diseases were more prevalent in many areas. Many coastal maize crops were killed out by flood rains and cob and stem rots were common.

WHEAT.

During the 1955-56 season, about 3,000,000 acres were planted to wheat in New South Wales and of these, 2,730,000 were harvested for grain. The estimated yield was approximately 57,000,000 bushels, making an average yield of 20.9 bushels per acre only a little lower than the highest record average for the State.

On the whole the season was a good one, although frost, hail and stem rust caused reductions in yield in many areas.

FROST INJURY was severe in many areas and was one of the main factors reducing yields this season.

STEM RUST (Puccinia graminis tritici). This disease was widespread and caused severe damage. In Western wheat growing areas, the epidemic was the worst for ten years and succeptible varieties like Bencubbin, Koala and Insignia were badly damaged. Generally, the varieties Charter, Festival, Celebration and Gabo were little affected in the Western areas although heavy stem rust was reported on some of them from other districts. Grain quality was adversely affected by the severe rust outbreak and many samples delivered to silos were eight to ten pounds below F.A.Q.

HAIL DAMAGE was severe in many districts, causing losses estimated at 2.7% of the total yield. Last year, with a yield of approximately 37½ million bushels, it was estimated that 560,000 bushels (1.5%) were lost through hail damage. This damage is very difficult to estimate and it is possible that cold and frost damage may contribute to the above calculations.

FLOOD DAMAGE. Generally speaking, little actual flooding of wheat crops occurred during the season, but quite extensive damage was caused by the heavy rain. Some flooding of crops occurred in the Gunnedah (N.W.S) area and along some of the North Western rivers. The wet weather caused a lowering in grain quality and some harvesting difficulties.

BUNT (Tilletia caries and T. foetida) was recorded mainly from the South West this season, although one record was received from Inverell (N.W.S). Carelessness in applying seed dusts and failure to apply them at all in some cases are responsible for many of the bunted crops seen.

GLUME BLOTCH AND NODE BREAKING (Septoria nodorum) was present in many areas this season. In many cases only the glumes and the top 6 inches of the stalk were attacked whilst in other cases the main damage occurred at the stem nodes. The glume blotch caused quite severe reduction in grain yield and quality in some cases. At Gunnedah (N.W.S) severe elbowing and lodging of crops occurred due to the node attack, practically no glume attack occurring here. The disease was favoured by wet weather as crops were maturing.

TAKE-ALL (Ophiobolus graminis) was present in many areas and was especially severe in the Wagga (S.W.S) and Berrigan (R) districts, reducing yields by as much as 30% in some cases.

At Mudgee (C.W.S) and Coonabarabran (N.W.P), late attacks were common and, in conjunction with node damage caused by Septoria nodorum the damage caused was severe.

FOOT ROT DISEASES (Various fungi) caused severe damage in many areas. In the Wagga (S.W.S) districts, these diseases threaten to become a major problem on the higher fertility soils where wheat follows a period under clover pasture.

HEAD BLIGHT (Fusarium graminearum) was recorded for the first time on wheat in N.S.W. from the Gunnedah (N.W.S.) area. Affected heads were bleached and discoloured and the grain was pinched. These plants showed a FOOT ROT condition caused by the same fungus, characterized by a pink discolouration of the basal stem regions and a rotting of the root system. The disease appears to be prevalent in the Gunnedah area.

OATS.

FROST AND COLD INJURY caused some damage and discolouration of young crops, especially in the North West but the symptoms disappeared as the weather became warmer.

STEM RUST (Puccinia graminis avenae) was prevalent in most areas, causing severe damage at Tamworth (N.T) and Berrigan (R). Rusted crops lodged in some cases and were difficult to strip and in many cases grain was small, pinched and of poor quality. In some cases, yields were reduced to such a level that harvesting was not economical.

CROWN RUST (Puccinia coronata) was prevalent in most districts, especially on the coast, this season.

PURPLE PATCH (Rhizoctonia solani) was recorded from Cootamundra (S.W.P)

BARLEY.

COVERED SMUT (Ustilago hordei) was recorded from one crop at Gunnedah (N.W.S) in which it was severe.

MAIZE.

RUST (Puccinia sorghi) was widespread, in coastal crops and was also recorded doing moderate damage to some crops on the Northern Tablelands.

LEAF BLIGHT (Helminthosporium turcicum) was prevalent in coastal crops.

STEM ROT (Gibberella fujikuroi var. subglutinans) was recorded on some inbred lines of maize at Grafton (N.C.) Experiment Farm. The disease was most severe in waterlogged patches and the perithecia of the causal fungus were found in abundance on the rotted stalks.

HEAD SMUT (Sphacelotheca reiliana) was recorded from a crop of the variety Victory at Richmond (M.A.) Infection was 100%. Neighbouring crops of the variety Emblem planted at the same time were free of infection as were volunteer Emblem plants in the Victory crop. Although many of the factors influencing the occurrence of this disease are not understood, it is possible that warmer and drier conditions than normal at sowing time made conditions favourable for this outbreak.

WATERLOGGING of many crops occurred on the North Coast during the heavy rains at the beginning of 1956. At Kyogle (N.C) crops planted in December had 50" rain over the next few months. Several were killed and others were growing so slowly that they were fed off. COB AND STALK ROTS were favoured by wet weather and were very prevalent on the North Coast during the wet winter of 1955. LODGING of many crops occurred in some areas and was favoured by high winds (Tumut, S.T)

SORGHUM.

KERNEL SMUT (Sphacelotheca sorghi) was recorded from two areas in the North West during the year, causing moderate damage.

MOULDY HEAD OR FALSE SMUT was again recorded from the Murrumbidgee Irrigation areas during the wet autumn. The wet weather at the time the heads are maturing causes the grains to burst, exposing the starch which provides an excellent medium for mould growth (mainly Alternaria spp)

RED STAIN (Undet.) occurred during the autumn in coastal crops and was associated with wet conditions.

RICE.

No rice diseases were recorded at the Biological Branch during the year.

SUGAR CANE.

(Information was kindly supplied by the Colonial Sugar Refining Co. Ltd.)

During 1955-56, 284,539 tons of cane were crushed in New South Wales. An estimated 416 tons were lost due to disease, this being about 0.14% of the tonnage crushed.

RED ROT (Physalospora tucumanensis) was again the most important source of loss this season, causing an estimated loss of 217 tons cane.

MOSAIC (Virus) caused an estimated loss of 184 tons and FIJI DISEASE (Virus) an estimated loss of 15 tons.

RATOON STUNTING (Virus) occurred extensively but the hot water treatment of seed cane is expected to bring this disease under control in the near future.

PINEAPPLE DISEASE (Ceratostomella paradoxa) was completely controlled this season by dipping setts in mercurial fungicides and no losses were sustained.

Other diseases such as CHLOROTIC STREAK (Virus) and RED STRIPE (Xanthomonas rubrilinians) were observed but their effect was only very slight.

MISCELLANEOUS GRASSES.

A BENT GRASS (Agrostis sp.)

SMUT (Tilletia sp., similar to T. Pallida). This disease has not been found in the field but was discovered in the Department's Seed Testing Laboratory as smut balls in seed samples. Its small size would make it inconspicuous in the field and it is not known how widespread it is. It had not previously been reported in this State.

QUNE GRASS (Agrostis tenuis)

BROWN PATCH (Rhizoctonia solani) was very prevalent and considerable damage was caused to sports areas.

DOLLAR SPOT (Sclerotinia homeocarpa) was prevalent on golf greens particularly on those in the immediate vicinity of the coast.

LEAF BLIGHT (Helminthosporium sp. associated) caused severe damage to golf greens at Asquith (M.A) and Cowra (C.T). Large brown patches were formed by leaves dying-off and the inorganic mercury compounds did not give successful control.

CANARY GRASS (Phalaris canariensis).

POWDERY MILDEW (Erysiphe graminis) was recorded for the first time in New South Wales on this host from Gunnedah (N.W.S)

COUCH (Cynodon dactylon).

BROWN PATCH (Rhizoctonia solani) was recorded from several localities in the Sydney Metropolitan area.

SALT TOXICITY caused the death of a couch lawn at Cobar (W.D.)

PASPALUM (Paspalum dilatatum)

ERGOT (Claviceps paspali) and ANTHRACNOSE (Colletotrichum graminicola) were prevalent as usual .

PHALARIS (Phalaris tuberosa)

ERGOT (Claviceps sp.) During the summer, several samples of Phalaris seed examined at the Seed Testing Laboratory were found to contain ergots of an unusual species of Claviceps. The samples came mainly from southern New South Wales, although ergots were found in some samples from other areas. The ergots are quite different from those of C. purpurea but so far the species concerned has not been determined. The disease has not been observed in the field, probably because of the small size of the ergots. Further work on the identification of the species concerned is in progress.

RYE GRASSES (Lolium spp.)

RUST (Puccinia graminis lolii) was of general occurrence in many districts. Perennial rye grass at Cootamundra (S.W.P) was heavily attacked whereas neighbouring H.I rye grass, which was grazed heavily, was only slightly affected.

SNOW GRASS (Poa sp.)

SMUT (Tilletia sp.) was recorded on a specimen of snow grass collected at Cathcart (S.T.) several years ago. This is the first record of the disease in New South Wales.

SUMMER GRASS (Digitaria sanguinalis)

SMUT (Ustilago rabenhorstiana) was severe in some patches of summer grass in the Glenorie (M.A) district.

MISCELLANEOUS TURF GRASSES.

During the year, several records of BROWN PATCH (Rhizoctonia solani)

COLLAR SPOT (Sclerotinia homoeocarpa) and FAIRY RING (various Basidiomycetes) were received from several areas in the State. Digitaria didactyla (a blue couch) was observed to be highly resistant to brown patch.

SLIME MOULDS were also encouraged by the wet weather and were commonly observed on lawns and in pastures.

FIELD AND FODDER CROPS.

Many clover diseases new to the State were found during the season. Two of these, rot (caused by Sclerotinia sp.) and scorch (caused by Kabatiella caulivora) are serious pasture diseases overseas. One of the most common and widespread clover diseases is the minute black leaf spot caused by Sphaerulina trifolii but only rarely does it do any serious damage to plants.

SUBTERRANEAN CLOVER (Trifolium subterraneum).

RUST (Uromyces trifolii subterranei) was widespread this season, the wet, humid weather giving ideal conditions for disease development. In most areas, the variety Mount Barker seemed to be especially susceptible and in many cases growth of this variety is being discontinued in favour of the less affected Bacchus Marsh.

SCORCH OR NORTHERN ANTHRACNOSE (Kabatiella caulivora). This disease was recorded in the variety Bacchus Marsh in the Berrigan Irrigation Area (R). Severe leaf attack caused the affected areas to have a scorched appearance and one area of 250 acres was completely killed out. The disease was not noticed until late in the season and it was not possible to estimate the total acreage of clover affected.

This disease has not previously been recorded in Australia and in view of its importance overseas, investigations have been started to determine the resistance of the numerous varieties of subterranean clover and of other species of Trifolium to the Australian isolate of the fungus.

STUNTING AND LITTLE LEAF (Virus). This disease, which was first recorded last year, spread over the whole of southern New South Wales during the winter. Most pastures were affected to some extent and in some cases up to 80% of the plants were attacked. At first it was feared that the disease would prevent seed setting but in the spring many pastures recovered and set seed normally.

This autumn the disease has been observed again but only at a few places in the Southern Districts and the damage caused is very slight. Work carried out by the C.S.I.R.O. Division of Entomology indicates that the disease is at least in part due to an aphid transmitted virus, both Aphis craccivora and, less efficiently, Myzus persicae being capable of spreading it. Preliminary tests indicate that the disease is not seed-borne.

LEAF SPOT (Cercospora sp. probably C. zebrina) caused severe blighting of subterranean clover on the south coast during the wet autumn months.

BURN (Sphaerulina trifolii) was recorded for the first time in New South Wales on this host from Walcha (N.C) and was also seen in many other areas. It appears to be one of the most common leaf spots of this plant but the spots are usually very small and inconspicuous and only rarely develop into the larger brown areas on which the fruiting bodies of the fungus are borne.

WHITE CLOVER (Trifolium repens)

RUST (Uromyces trifolii trifolii-repentis) was very severe during the spring and early summer months, especially on the North Coast where extensive damage occurred.

ROT (Sclerotinia sp.) was recorded from Upper Orara (N.C.) and Deniliquin (R). It developed in early spring and caused severe damage. At Deniliquin, perennial rye grass (Lolium perenne) leaves in contact with the rotted clover were also rotted but otherwise these plants were not attacked. This is its first record in New South Wales on this host.

BURN (Sphaerulina trifolii) was recorded for the first time in this State from Deniliquin (R) and Oberon (C.P). At Deniliquin the disease was severe, causing shrivelling of leaves and streaky lesions on the petioles but at Oberon only moderate damage was caused. The small spot phase of this disease has been observed in many districts and it appears to be one of the most common clover diseases in the State, although rarely causing severe damage.

GREENING (Virus) was common in many districts this season.

ROOT KNOT (Meloidogyne sp.) caused quite severe damage to white and red clover in 10 acres of mixed pasture at Murwillumbah (N.C)

RED CLOVER (Trifolium pratense)

ROT (Sclerotinia sp.) was recorded on clovers for the first time in New South Wales from Upper Orara (N.C), Deniliquin (R) and Leeton (M.I.A). At Upper Orara, both white and red clovers were attacked, patches 1 - 1½ feet in diameter being formed in the pasture Rye grass (Lolium sp.) and cocksfoot (Dactylis glomerata) in these patches were not attacked. Overseas clover rot caused by Sclerotinia trifoliorum is a serious pasture disease and investigations are being undertaken to see if this species is concerned here.

LEAF SPOT (Stagonospora recedens) was recorded causing very severe damage to red clover at Oberon (C.T.) It began in early spring and, with the wet weather, had become very severe by the middle of summer, causing a considerable reduction in yield. The disease had not previously been recorded in New South Wales.

BACTERIAL LEAF BLIGHT (Pseudomonas syringae), recorded for the first time last year, was again present in pastures at Oberon (C.T). Wet conditions favoured its development.

SOOTY BLOTCH (Cymadothea trifolii) was severe on red clover at Oberon (C.T) during the summer.

OTHER LEAF DISEASES were LEAF SPOTS caused by the fungi Pseudopeziza trifolii and Mycosphaerella (this latter's first record in this state) at Oberon (C.T.) and BURN (Sphaerulina trifolii) which caused severe damage at Glen Innes (N.T) and Oberon (C.T).

GREENING (Virus) was widespread this season in most districts.

RUGOSE LEAF CURL (Virus) was recorded for the first time in this State on a small number of plants at Grafton (N.C).

ROOT KNOT (Meloidogyne sp.) severely damaged red and white clovers in one area at Murwillumbah (N.C). This pest has caused damage to clovers on the North Coast in previous years and may be important as a cause of clover decline in some pastures in this area.

CRIMSON CLOVER (Trifolium incarnatum):

RUST (Uromyces trifolii)was recorded from Taree (C.C.). Only a few plants were affected.

ROT (Sclerotinia sp.). Red clover in plots at Leeton (N.I.A.) was heavily attacked. This is the first record of this disease on this host in New South Wales.

ROOT KNOT (Meloidogyne sp.) caused severe damage to 2 acres of crimson clover in the Murwillumbah (N.C.) district.

BURR MEDIC (Medicago denticulata):

LEAF SPOT (Pseudopeziza medicaginis) caused severe damage at Glen Innes (N.T.) in the early winter. Conditions were very wet and the disease killed off many plants.

MOSAIC (Virus ?) was seen on several plants growing at Toongabbie (M.A.).

LUCERNE (Medicago sativa):

ROOT ROT (Phytophthora sp. probably P. cryptogea) was recorded for the first time in New South Wales at Woodstock (C.F.). During the very wet late summer and autumn root and crown rots of lucerne were very common in most districts, and many stands were killed out. In most cases, fungi such as Rhizoctonia and Fusarium were found associated with rotten roots but from the Woodstock specimens, a species of Phytophthora was obtained from young lesions on the roots. It is suspected that this fungus is responsible for a large amount of the root rot observed this season, but was not isolated due to the advanced stage of decay of many of the roots examined.

RUST (Uromyces striatus var. medicaginis) caused severe defoliation in many crops at Gunnedah (N.W.S.) and was responsible in some cases for seed failure.

LEAF SPOT (Pseudopeziza medicaginis) was responsible for severe defoliation in many districts.

ANTHRACNOSE (Colletotrichum trifolii) caused yellowing of leaves and retarded growth of lucerne at Tamworth (N.T.). Attack occurred mainly at the base of the stem towards the end of the summer.

WITCHES BROOM (Virus) was common in most districts.

COWPEA (Vigna sinensis):

LEAF SPOT (Cercospora sp.) caused considerable damage to a cowpea crop sown for green manure at Narara (C.C.) during the autumn.

STEM ROT (Phytophthora sp.) was very severe in crops at Kyogle (N.C.) and a much larger area was attacked than last season. The disease was favoured by the wet weather.

LINSEED (Linum usitatissimum):

PASMO (Mycosphaerella linorum) occurred in most linseed crops this season and in some cases caused severe damage. At Wollongbar (N.T.) the variety Maine was only lightly attacked whereas the disease was heavy on other varieties.

ZINC DEFICIENCY was observed in one crop in the North West, affected plants showing the typical bronzing of the leaves and bunched apical growth.

SAFFLOWER (Carthamus tinctorius):

Two new diseases were recorded on this host. They were SCLEROTINIA STEM ROT (Sclerotinia sclerotiorum) and STEM ROT (Macrophomina phaseoli) both of which occurred in the Gunnedah (N.W.S.) district. In the Murrumbidgee Irrigation Area, patches of safflower were also killed out by SALT.

TOBACCO (Nicotiana tabacum):

BACTERIAL WILT (Pseudomonas solanacearum) completely destroyed some tobacco seed beds at Bourke (W.D.) during the early summer, making complete replanting necessary.

BLUE MOULD (Peronospora tabacina) was reported from Bourke (W.D.), Bathurst (C.T.) and Tenterfield (N.T.) and caused some damage especially in seed-beds.

HOPS (Humulus lupulus):

WATERLOGGING caused the death of 1 acre of hops at Laughtondale (C.C.) during the floods in the early autumn.

CANE FRUIT.

BOYSENBERRY, YOUNGBERRY.

ANTHRACNOSE (Elsinoe veneta). Wet conditions on coast and tablelands during summer and autumn again favoured the development of this disease.

RASPBERRIES.

LEAF SPOT (Septoria sp.) was reported from Terrey Hills (M.A) and Oberon (C.T.)

CITRUS FRUITS.

PHYTOPHTHORA ROOT, COLLAR & FRUIT ROT (Phytophthora citrophthora). In coastal N.S.W. a moderately dry spring was followed by ~~recent~~ record rains and prolonged periods of low light intensity in February and March. Low lying areas in the Hills (M.A) and Gosford districts were waterlogged and in many upland orchards in the Somersby-Kulnura (C.C) area existing

drainage was not able to remove the water. There was a sharp increase in collar and root rot activity and further decline of already affected trees, the full effects of which are only gradually becoming apparent. Greatest devastation occurred in the Hawkesbury Valley where three floods in close succession occurred in February and March, over the areas which had suffered so severely in the 1949-52 seasons. New planting had gone on in this area and 36,000 young trees, almost all trifoliata stock had been established and were in a flourishing condition. Much of this has now been destroyed, some by scouring, some overwhelmed by mud and debris, but most by Phytophthora citrophthora attack on foliage, branches and trunks. It is evident that following the first flood, zoospore formation on the waterlogged soil was intense, and the second flood, which though not so high as the first, caused more damage, was loaded with infective material. Thousands of older trees which had survived the 1949-52 flood periods were also killed. All submerged leaves and fruit were infected ~~and fruit were infected~~ and multiple infection of branches and trunks occurred. Trifoliata stocks also died. No pathogen was found in these and it is thought possible that death may have resulted from the decomposition of masses of organic matter caught round the trees. Similar destruction of orchards occurred in the Bourke (W.D) areas where the Darling River has been in intermittent flood throughout the year.

In the Paterson area (C.C.) losses of seedling Emperor mandarins 15-45 years old occurred in lower parts of orchards and one planting of 4,000 trees of sweet orange seedlings at Mt. Rivers (C.C.) has been almost completely destroyed.

In the Murrumbidgee Irrigation areas the weather was unusually wet throughout winter, spring and summer and trees on rough lemon stock continued to decline. Trees on trifoliata are progressing very well. At Narromine (C.W.S) also there has been further deterioration in the condition of trees in affected orchards. The Macquarie River has been in flood and orchards in low lying areas inundated. Some losses of Washington Navel oranges and lemon fruit occurred in the Hills, (M.A) Wyong (C.C.) and Yarramundi (M.A.) districts and all fruit in the flooded areas of the Hawkesbury River were lost with brown rot.

Heavy rates of infection of seedling stocks and budded trees occurred in a number of metropolitan nurseries and at Narara Citrus Experiment Station. (C.C).

BROWN ROT & SHOOT BLIGHT (Phytophthora hibernalis) A heavy infection of fruit and shoot blight of oranges and mandarins was reported from Wallendbeen (S.W.S) in September 1955, following winter and spring weather of unusual rain. The occurrence of the disease in an isolated homestead orchard is of considerable interest since P. hibernalis is seen only very rarely in N.S.W.

BLACK SPOT (Guignardia citricarpa) Black spot was first seen early in October 1955 at Pitt Town and Cornwallis (M.A.) and in the Gosford district (C.C.) following warm weather in September. By late October the disease was widespread and fruit fall was heavy to very heavy in the Gosford district (C.C.) and parts of Windsor, Richmond and the Hills (M.A.). In Gosford it was reported that severe spot occurred on trees which had been sprayed with Bordeaux Mixture, with spreaders other than white oil.

Quite severe spot was noted on young trees 6-10 years old at West Pennant Hills and Pitt Town (M.A.).

Speckled blotch did not occur during winter 1956 but some virulent spot was observed on lemons and Washington Navel oranges at Lower Hawkesbury (M.A.) in May 1956.

MELANOSE (Diaporthe citri) Infection was widespread and severe in all coastal districts, particularly in old trees with accumulated dead wood. In particular Washington Navel oranges, Seville oranges and Emperor mandarins in the Windsor, Richmond and Hills (M.A.) and Gosford (C.C.) districts showed a high proportion of blemished fruit. Limb dieback was also observed at Yarramundi and Pitt Town (M.A.). Some collar rot due to this furgus occurred in a Pitt Town orchard affecting young Emperor mandarin trees.

SCAB (Sphaceloma fawcettii scabiosa) Main crop lemons in coastal orchards were for the most part singularly free of scab. A few reports of severe infection where spraying was not carried out were received from the Hills (M.A.) district. Scab infection of intermediate settings of fruit was heavy in most coastal orchards and infection of foliage also occurred.

Infection of Rough Lemon seedling stocks in Metropolitan and Gosford (C.C.) nurseries was severe and resulted in reduced growth.

Heavy foliage infection of young Emperor mandarin trees occurred during autumn at Paterson (C.C.) and Cleopatra mandarin stock at Narara Citrus Experiment Station (C.C.) were infected.

BROWN SPOT (~~suppected~~ Cause not known) fruit and foliage damage was rather slight during spring and early summer in the Hawkesbury River and Hills district (M.A.) but with the onset of rain in midsummer infection became widespread and moderate to heavy losses of fruit occurred. In spray trials at Pitt Town (M.A.) a combined micronised copper oxychloride and zineb spray gave outstanding control, and copper oxychloride & Zinc Bordeaux were each satisfactory. Zineb, Ziram, and Fixtan were ineffective.

No brown spot was noted in orchards of seedling mandarins at Paterson (C.C.) and some Lower Hawkesbury (M.A.) orchards are also free of it.

Symptoms suggestive of brown spot were seen on the Thomasville citrangequat at Narara Citrus Experiment Station (C.C.) Young growth on rough lemon trees in Hills district (M.A.) and Windsor district (M.A.) orchards showed considerable spotting during summer.

SEPTORIA SPOT (Septoria depressa). Infection was more prevalent in M.I.A. orchards than for many years, the result of the relaxation of control measures by growers following absence of this disease for some seasons. Winter conditions (1955) favoured the development of spot. Weather conditions during autumn 1956 were extremely favourable for infection and delayed the application of sprays, and it is anticipated that the current season's crop will show a high rate of spot development.

ARMILLARIA ROOT ROT (Armillaria mellea). A number of seven year old Valencia oranges on trifoliata stock in an Emu Plains (M.A.) orchard became infected with Armillaria. The land had been cleared for over 100 years and the previous crop had been plum trees, removed at an age of about 45, followed by wattle scrub.

New infections were also reported from West Pennant Hills (M.A) (trifoliata stock, 6 years), Kurrajong (C.T) and Lower Portland (M.A.).

SOOTY BLOTCH & FLY SPECK (Gloeodes pomigena and Leptothyrium pomi.) Continued wet weather throughout the summer and early autumn favoured the development of these diseases and fruit of all varieties on unsprayed trees was heavily blemished in all coastal areas.

BLUE & GREEN MOULD (Penicillium digitatum and P.italicum). A slight amount of infection was reported from central coast and metropolitan areas.

BLACK ROT (Alternaria citri) was reported from Bourke (W.D) causing appreciable infection of Washington Navel oranges and mandarins, and from Coonamble (C.W.P) affecting Washington Navel orange fruit, in spring 1955.

PINK WOOD ROT (Corticium salmonicolor) was reported from orchards at Kempsey (N.C.) and Wauchope (N.C.).

SUDDEN DEATH (Undetermined). Additional cases were reported from West Pennant Hills (M.A), Ourimbah (C.C) and Somersby (C.C.).

SCALY BUTT (Virus) Position unchanged.

SHELL BARK (Suspected virus) Position unchanged.

STEM PITTING (Virus) Position unchanged.

TRISTEZA (Virus) Position unchanged.

PSOROSIS-TYPE VIRUS (Florida gummosis) Position unchanged.

PSOROSIS A (Virus) A catalogue of psorosis A infected trees is being compiled. Only one new occurrence of note has come to light. In a block of 235 fifteen year old Valencias at Pitt Town (M.A) two trees showing bark symptoms had been located, and a check of leaf symptoms in the spring revealed that 40% were infected. Most of these are at present very vigorous and well grown for their age.

? PSOROSIS B (Virus) Mature trees of Valencia orange at Niagara Park (C.C) which three years ago showed symptoms highly suggestive of psorosis B (at that time referred to as Florida gummosis) have now partially healed but are showing extension of bark scaling typical of psorosis A. A further extension of the severe type of gumming was observed in the spring in about half of the previously unaffected Valencias in this orchard.

CRINKLE LEAF (Virus). A block of about 1 acre of 25 year old Eureka lemons at Somersby (C.C.) was located in which crinkle virus is present. Only three trees showed symptoms in a severe form. A high proportion of the remainder showed crinkle symptoms on one limb or branch. The trees appeared to be of normal vigour and productivity. A block of about two acres of 12 year old Eureka lemons at Lower Hawkesbury (M.A) was located in which almost all trees show symptoms. The trees are highly productive and vigorous and the fruit unblemished. Glasshouse inoculation trials indicate that the variability in symptom expression may be due to the presence of strains of virus.

ROUGH LEMON DECLINE (suspected virus). Further cases of this disease were observed in orchards at Yarramundi (M.A), Raymond Terrace, (C.C) Ebenezer (M.A), Colo (M.A.), Glenorie (M.A.), Kurrajong (C.T.) Pitt Town (M.A.) At Yarramundi a tree inarched 8 years previously with 3 trifoliata stocks showed considerable recovery and good growth of inarches. Partly self rooted trees at Yarramundi and Raymond Terrace showed arrest of decline symptoms. Evidence of spread to previously healthy trees was seen at Raymond Terrace, Colo and Pitt Town. One definite symptom of this disorder is the over growth of the scion. Pitting of the wood of the stock may or may not be present.

? XYLOPOROSIS (Virus) symptoms resembling those described for xyloporosis in Palestine were shown by 32 trees of Washington Navel orange on sweet lime stock in a stock trial at Yarramundi (M.A).

ROOT KNOT (Meliodogyne sp.) was noted on young orange trees on rough lemon stock at Cornwallis (M.A). The land had been used for vegetable production for many years prior to planting with citrus. The infection was relatively heavy.

YELLOW LEAF (Magnesium deficiency). Continues to increase in severity and very few orchards in coastal N.S.W. are completely free of it. In particular trees in the lower Hawkesbury, Gunderman Hills (M.A) and Gosford district showed very severe symptoms. The difficulty of obtaining good grade dolomite is retarding treatment of this deficiency. Foliage sprays and soil applications of magnesium sulphate at Tocumwal (R) did not give satisfactory results.

EXANTHEMA (copper deficiency). Very severe symptoms of copper deficiency were seen in orchards at Yarramundi (M.A) in young Washington navel and Valencia oranges, and in several young mandarin trees in Paterson (C.C) orchards.

Symptoms of exanthema were also seen in fruit from Jerilderie (R). This is the first case of definite copper deficiency in citrus from the Western parts of the State.

MOTTLE LEAF (Zinc deficiency) continues to increase in importance in coastal districts. Symptoms were noticed at Pitt Town, Richmond (M.A) Mangrove Mountain and Somersby (C.C) and in a number of Hills districts (M.A) orchards. It was also general in orchards in the Western parts of the State.

MANGANESE DEFICIENCY has been extremely prominent during the past season in orchards in the Glenorie area (M.A). The soil in this district is a sandy clay loam with iron stone and is moderately acid. Good control nas been obtained with foliage sprays. Zinc and magnesium deficiency is usually associated. Manganese deficiency was also reported from Inverell (N.W.S) on trees growing in red volcanic soil.

YELLOW BLOTCH (suspected molybdenum deficiency). Quite severe yellow blotching of foliage of young orange trees was reported from a Glenorie (M.A.) orchard, accompanied by poor cropping and some leaf fall. Application of molybdenum as a spray in November resulted in increased growth but the yellow blotch leaf pattern was not entirely eliminated. Similar yellow blotching was observed in the spring in other orchards at Pitt Town (M.A) and Glenorie but proved to be transient.

SUSPECTED BORON DEFICIENCY. Grapefruit showing symptoms suggestive of boron deficiency were received from Tamworth (N.W.S) in winter 1956.

DRY STEM (Physiological) was more severe and general than usual in Griffith (M.I.A.) orchards. A spray of 2, 4 - D at 22 ppm gave some control. Severe losses due to dry stem were also reported from a Kurrajong (C.T.) orchard, and from north Richmond (M.A.) during December, 1955.

PETECA. Orange fruit showing symptoms of peteca were observed in an orchard at Barham (R.) on late hanging Valencia oranges. Infection was limited to a few trees.

"WINTER YELLOWING" (cause unknown). This disorder was much less important than in previous years. It was reported affecting a low proportion of young trees in some Mallee Cliffs (W.D.), Griffith (M.I.A.), Cornwallis (M.A.), Dooralong (C.C.) and Cattai (M.A) orchards.

SEVILLE DECLINE. Very severe dieback resulting in death of some trees was observed in a Castlereagh (M.A.) orchard of 12 year old bitter sweet seville oranges. Chemical analyses of the leaves suggest low potash-phosphate as a possible contributing factor, associated with very heavy cropping. The trees had received 7 lbs. per annum of sulphate of ammonia for five years and no other fertiliser.

FRUIT ROT (Colletotrichum gloeosporioides). A fruit rot, and fruit fall caused by this fungus invading fruit injured by hail was observed on a Yarramundi (M.A.) orchard. Only bitter sweet seville oranges were affected. Fruit of other varieties healed normally after the hail damage and no infection occurred.

HAIL DAMAGE. Hail storms which occurred during early and mid summer caused considerable losses of immature fruit and some defoliation particularly in the Hills and Hawkesbury River districts (M.A.).

Injury to fruit which remained on the tree resulted in skin marking and fruit deformation and consequent down grading at harvest. Some fruit rot following hail was reported from Yarramundi (M.A.) (See previous entry).

YELLOW TIP (Buiret injury) was observed in trees sprayed with Urea at Wilberforce (M.A.). The injury was slight.

SKIN SCALDING (cause unknown) was reported on grapefruit and lemons from Barham (R.) and Lake Wyangan (M.I.A.).

ALGAL & LICHEN GROWTH. The prolonged period of rain and high humidity during summer and autumn permitted the growth of foliicolous lichens and green algae on citrus foliage especially in shaded sections of some coastal orchards.

POME FRUIT.

Heavy setting occurred in most districts but crops were seriously reduced by hail damage and black spot infection. Hail damage has been estimated at £250,000.

APPLE:

BLACK SPOT (Venturia inaequalis). Many districts experienced record rainfall for the growing season and black spot reached epiphytotic proportions in orchards where spraying schedules were not adequate for the season.

In orchards where the full schedule of recommended sprays was applied, excellent control was obtained. Unfortunately in many orchards, spraying of the late maturing varieties either ceased or was relaxed when harvesting of the earlier maturing varieties commenced. Consequently in varieties like Granny Smith "late spot" developed extensively either about harvest time or in store. At Batlow (S.W.S.) the first lesions for the season were observed on 14th October. In that district there were six infection periods during October and November.

In many tableland districts the ground became water-logged during the spring and where growers were dependant upon wheeled traction for their spray machinery, even in orchards under permanent sod, it was difficult to maintain an adequate schedule of sprays. Many growers experienced the heaviest black spot infection they have known.

In the Murrumbidgee Irrigation Areas, infection was slight and confined to a small number of orchards.

In coastal districts black spot infection was much more severe than usual.

POWDERY MILDEW (Podosphaera leucotricha). Infection was again prevalent especially on Jonathan and Rome Beauty. At Young (S.W.S.) substantial infection occurred on these two varieties even where sulphur schedules were applied. At Orange (C.T.) a few blocks of Granny Smith became heavily infected. In coastal districts many early maturing varieties were heavily infected. In some orchards on the Northern Tablelands infection was very heavy especially on Jonathan.

LIMB CANKER AND DIEBACK (Botryosphaeria ribis). Some limb cankering occurred but the spur and shoot blight phase again caused most damage. Good control of the latter phase is being obtained by spraying with thiram.

RIPE ROT (Gloeosporium sp.) Severe infection occurred on Willie Sharp in coastal orchards. Some later maturing varieties were also infected to a lesser degree in coastal districts. Slight infection occurred on Sturmer and Jonathan at Bilpin (C.T.). Good control was obtained with thiram sprays.

ROOT ROT (Armillaria mellea) was reported from Mount Tomah (C.T.) and Batlow (S.W.S.). At Batlow infection occurred in six-year-old trees in blocks from which green timber had been cleared shortly before planting. In some of these blocks about 2% of trees were infected. In many cases the trunk had been girdled.

SOOTY BLOTCH (Gloeodes pomigena). Infection was fairly common in the Metropolitan area and the Camden (S.C.) district, especially on trees sprayed with organic fungicides for black spot control, where spraying ceased with the onset of almost continuous rain in February. Where lime sulphur had been used the sooty blotch incidence was much lower.

PINK LIMB BLIGHT (Corticium salmonicolor) was fairly prevalent at Gosford (C.C.). It was also recorded at Kurrajong Heights (C.T.) and the far north coast.

COLLAR ROT (undet.). On the lower Hawkesbury River (M.A.) a small number of apple trees in small orchards and home gardens died of a collar rot following the floods in February. Upstream on the Nepean River at Cobbitty there was some further activity of collar rot in an orchard of Gravenstein apples following inundation in February.

Phytophthora cactorum is suspected as the pathogen.

APPLE MOSAIC (Virus) was again widespread.

GREEN CRINKLE (Virus). Symptoms resembling those of green crinkle occurred extensively in an orchard at Uralla (N.T.). The disease was also detected at Vittoria (C.T.)

PHYSIOLOGICAL DISEASES. Seasonal conditions favoured the development of bitter pit which, despite the heavy crops, occurred to serious degree in many orchards sprayed with organic fungicides. It did not occur in orchards sprayed with sulphur unless the crop was a very light one. The thinning effect of thiram on Granny Smith and the increased size developed under organic fungicide schedules were prime factors in predisposing fruit to bitter pit under the seasonal conditions experienced. Soils were in a waterlogged or near waterlogged state during the two months preceding harvesting, this following an abnormally wet spring and summer.

Jonathan spot was prevalent on red varieties in most districts. At Batlow (S.W.S.) where over 90 inches of rain was recorded from June 1st, 1955 to May 31st, 1956 and where the soil was saturated to waterlogged for almost the entire season, Jonathan spot became evident as the fruit approached maturity.

Watercore was severe in Granny Smith in some orchards in the Sydney Metropolitan area.

HAIL. Severe hail damage occurred in most districts and was responsible for the rejection and down-grading of a very substantial proportion of the crop.

PEAR.

BLACK SPOT (Venturia pyrina). An eiphytotic of pear scab occurred similar to that of apple scab, except that infection was more severe early in the season, and "late spot" was not as severe as in the later maturing apples. The heavy early infection, is believed to have been a prime factor responsible for heavy shedding of young fruit in some orchards

Black spot was prevalent on pears at Leeton (M.I.A.).

In many instances growers reported pear scab more difficult to control than apple scab.

BLAST (Pseudomonas syringae) was of no consequence this season.

FLECK (Fabraea maculata) some infection occurred on the Northern Tablelands.

HAIL. Severe hail damage occurred in most districts.

QUINCE.

FLECK (Fabraea maculata) was widespread and severe. Many trees had been defoliated by the New Year. At Young (S.W.S) control was poor where the normal apple black spot schedule was applied to quinces.

STONE FRUITS.

Stone fruit crops were generally good but final yields were seriously reduced by hail damage, brown rot and freckle.

ALMOND.

SHOT HOLE (Clasterosporium carpophilum). Infection was severe wherever control measures were inadequate.

RUST (Puccinia pruni-spinosae). Severe rust infection was recorded at Ocbar (W.D.).

APRICOT.

BACTERIAL CANKER (Pseudomonas syringae) was of no consequence this season.

BROWN ROT (Sclerotinia fructicola). Substantial losses occurred on the Murrumbidgee Irrigation Areas, mainly as a result of blossom blight.

SHOT HOLE (Clasterosporium carpophilum). Infection conditions were favourable in all districts and severe infection occurred in many orchards.

FRECKLE. (Fusicladium carpophilum). An epiphytotic of freckle occurred in coastal and tableland districts. Thiram continues to give excellent control.

RUST (Puccinia pruni-spinosae). In coastal districts infection was very heavy and resulted in premature defoliation.

ROOT ROT (Phytophthora cinnamomi). Heavy losses were again sustained in young trees in coastal districts following heavy and prolonged rain from mid-January through till late autumn.

BLACK HEART (Verticillium dahliae). Infection was recorded at Wollongong (S.C.) and in further orchards at Griffith (M.I.A.).

SILVER LEAF (Stereum purpureum), was detected on one Glenaarry apricot tree at North Kurrajong (C.T.). This disease is rarely seen in N.S.W. It was recorded on apple in 1912 and was observed on a peach tree at Beecroft (M.A.) in 1952. These are the only records of its occurrence in N.S.W.

GREEN FRUIT ROT (Sclerotinia sclerotiorum) occurred at East Kurrajong (C.T.) and at Koraleigh (W.D.) the infection taking place at or shortly after the shuck fall stage.

CHERRY.

BACTERIAL CANKER (Pseudomonas syringae). Slight infection occurred at Orange (C.T.) and Young (S.W.S).

BROWN ROT (Sclerotinia fructicola). Severe blossom blight occurred in some orchards at Orange (C.T.) causing up to 80% reduction in crop in the most severe instances. The incidence of brown rot in the maturing crops at Orange was less than in the previous year due probably to the lighter setting in singles and small bunches rather than in large bunches. Good control by organic fungicide sprays, particularly thiram, was reported from all districts.

Infection was heavy in some orchards on the Northern Tablelands, but at Young (S.W.S) losses were slight.

VIRUS DISEASES AND VIRUS-LIKE CONDITIONS. The position has not changed since last season.

NECTARINE.

BROWN ROT (Sclerotinia fructicola). Severe infection occurred in many districts, the invasion of the fruit being facilitated in many instances by hail damage.

FRECKLE (Fusicladium carpophilum). An epiphytotic of freckle occurred in coastal districts. Some growers experienced fruit burn from excessive applications of sulphur used for control of this disease.

ROOT ROT (Phytophthora cinnamomi) caused substantial losses of young trees planted in the heavier soils in the Metropolitan area, wherever drainage was not satisfactory.

RUST (Puccinia pruni-spinosae). Premature defoliation was again common in coastal orchards. Severe fruit infection occurred at Young (S.W.S). In the affected orchards at Young leaf infection was only slight.

LEAF CURL. (Taphrina deformans). Infection was severe wherever control measures were neglected.

PEACH.

BROWN ROT (Sclerotinia fructicola). For the second successive year an epiphytotic of brown rot occurred on the Murrumbidgee Irrigation Areas. The loss was approximately 5,000 tons (25% of estimated crop). The brown rot infection was facilitated by some hail damage and by damage caused by the oriental peach moth. Brown rot epiphytotics have occurred on the Murumbidgee Irrigation Areas with increasing frequency during the last decade. The first recorded outbreak was in 1934 and the first epiphytotic occurred in 1946 when the loss was approximately 25% of the estimated crop. Since then there have been serious outbreaks in 1949 (30% loss) and 1950, small losses in 1951 and 1953 and finally two successive epiphytotics in 1955 (20% loss) and 1956 (25% loss). The increasing frequency of brown rot in this normally hot dry continental climate is related to three major factors, firstly the establishment of the brown rot fungus within the trees during the 1946 epiphytotic; secondly a succession of seasons much wetter than normal; and thirdly the introduction to and spread of the oriental peach moth throughout the area.

Brown rot occurred in other districts in epiphytotic proportions also, especially in dessert varieties in coastal districts. Hail damage in all districts faciliated fungal invasion of fruit and, in some cases, laterals. A great deal of lateral infection occurred in all districts and was particularly severe in the Murrumbidgee Irrigation Areas.

Despite the severe conditions many growers obtained very good control especially with thiram, ziram and captan where recommended schedules were intelligently followed and where damage from hail and insects was at a minimum during the ripening period. One grower at Griffith (M.I.A) saved 14 acres of canning peaches by applying an extra spray during harvest. In one day he covered 14 acres with his concentrate sprayer leaving two rows unsprayed. Brown rot infection was severe on the unsprayed rows and well controlled on the remainder of the block.

ROOT ROT (Phytophthora cinnamomi). Ideal infection conditions again occurred during the late summer and autumn. In many coastal districts soils became waterlogged in January and remained either waterlogged or saturated until late autumn. In orchards and nurseries on the heavier soils in these areas tree mortality was rapid and high. On the Murrumbidgee Irrigation Areas soils were waterlogged through the late summer, autumn and winter and considerable tree mortality due to Phytophthora root rot or salt toxicity or both is anticipated. In Tableland districts soils were waterlogged or nearly so throughout the growing season and into the winter and some tree mortality resulting from Phytophthora root rot may be anticipated wherever drainage is inadequate.

RUST (Puccinia pruni-spinosae). Severe premature defoliation again occurred in early maturing varieties in coastal districts. Rust was of no consequence in tableland districts. On the Murrumbidgee Irrigation Areas a light but general leaf infection occurred and there was appreciable fruit infection in several orchards.

FRECKLE (Fusicladium carpophilum). Infection was heavy in late maturing varieties in coastal districts wherever the control measures recommended by this Department were not closely followed. No infection was observed in tableland or inland districts.

LEAF CURL (Taphrina deformans). Severe infection occurred wherever control measures were neglected or imperfectly applied.

SHOT HOLE (Clasterosporium carpophilum). Infection was general and in some cases severe. Considerable fruit damage occurred at Young (S.W.S).

CROWN GALL (Agrobacterium tumefaciens) was again a problem in nurseries.

ROOT KNOT (Heloidogyne sp.) Severe infestation of peach roots by M.javanica was reported from Wedderburn (S.C) and Griffith (M.I.A). At Speers Point (C.C) the roots of young trees were found to be infested by M. incognita var. acrita.

WOOD ROTS (Polystictus spp. and Schizophyllum commune).

The prolonged wet weather and lack of sunshine favoured wound invasion by wood rotting fungi, particularly in the older trees in coastal districts.

HAIL. Many crops were destroyed by hail, particularly in coastal districts. Hail was experienced in all districts and, in addition to the fruit directly destroyed, the lesser injuries facilitated brown rot infection.

PLUM.

BROWN ROT (Sclerotinia fructicola). Severe infection occurred in tableland areas and at Young (S.W.S). At Young a considerable degree of infection occurred in some prune orchards, and in some instances there were losses of fruit between the time of harvesting and processing.

RUST (Puccinia pruni-spinosae). In the Metropolitan area severe rust infection and premature defoliation occurred in early maturing varieties. At Young (S.W.S) infection of prunes was first detected in unsprayed orchards in mid-December, and by early January such orchards were heavily rusted. The disease made further rapid progress there during the rains in late February and early March, and many unsprayed or inadequately treated orchards were completely defoliated by mid-March. This contrasted markedly with orchards sprayed with an adequate schedule of weak Bordeaux mixture or Zineb plus white oil sprays in which the trees held their foliage until May.

SHOT HOLE (Clasterosporium carpophilum). Leaf infection was general.

MISCELLANEOUS FRUITS.

MULBERRY

LEAF SPOT (Septogloeum mori) was prevalent in tableland and inland districts.

BACTERIAL SPOT (Pseudomonas mori) was prevalent in coastal and tableland districts.

WALNUT

BACTERIAL BLIGHT (Xanthomonas juglandis). Severe infection occurred in all districts.

PERSIMMON

LEAF SPOT ?(Mycosphaerella sp.) was recorded as causing premature defoliation at Black Hill and Ourimbah (C.C.) and at Carlingford (M.A).

TROPICAL FRUITS.

BANANA:

BUNCHY TOP (Virus). Records compiled by the Division of Horticulture show that a total of 3,159 infected plants were found and destroyed during the year, an increase of 350 plants on the previous year's figures. Bunchy top records for the four preceding years have been: 1951-52, 3654; 1952-53, 2427; 1953-54, 3164; and 1954-55, 2809. Experiments are in progress to examine the effect on disease incidence of vector and ant control in plantations which contribute the majority of infected plants each year.

LEAF SPOT (Cercospora musae). Losses from leaf spot were heavy over the whole of the Far North Coast Region, the disease being favoured by a very wet summer and autumn. Largely because of adverse weather conditions and increased labor costs very little protective spraying was carried out by growers. Defoliation was increased by cold winds and frosts and even where spraying was well done loss of leaves because of winter injury tended to nullify its benefits. The combined effect of leaf spot and winter injury of foliage produced the worst defoliation on record.

SPECKLE (Cause undet.). Losses of foliage as a result of this disease were also very heavy, particularly in the Coff's Harbour (N.C.) area.

BANANA DISEASE (Fusarium oxysporum cubense). There was a small outbreak of this disease during the very wet autumn at the Duranbah Experimental Plots in the variety carrying the label "Lacatan."

BURROWING NEMATODE (Radopholus similis). This parasite was reported by Mr. J. Fisher of the Waite Research Institute as being present in preserved specimens of banana roots collected by him at Murwillumbah (N.C.) in 1955. The parasite was found in small cortical lesions and was considered a possible contributing factor in the rotting of banana roots. In Queensland "bunched throat" of banana plants is considered to be associated with this nematode.

HEART LEAF ROT (Winter injury). Many hundreds of plants in the Tweed and Brunswick district developed a rot of the heart leaf late in the winter of 1956. The rot in some cases merely deformed a few leaves but in a large number of cases it extended down the central cylinder as far as the growing point or into the corm, leading to death of plants. Sucker growth on such plants was normal as spring advanced. Fusarium moniliforme var. subglutinans and several species of bacteria were associated with the rot. In the central cylinder examinations indicated that the bacteria were active well in advance of the associated fungus.

PASSIONFRUIT:

BROWN SPOT (Alternaria passiflorae). Losses from this disease were again severe, even in sprayed plantations.

FUSARIUM WILT (Fusarium oxysporum var. passiflorae). The disease was recorded only from Murwillumbah (N.C.).

SCLEROTINIA ROT (S. sclerotiorum) was severe in many crops in the Far North Coast Region during September 1955.

ROOT KNOT (Meloidogyne sp.). Several plantations at Terrigal and Avoca were found to be very heavily infested during October. Pronounced yellowing of foliage accompanied the root knot.

MISCELLANEOUS FRUITS.

GRAPES:

DOWNY MILDEW (Plasmopara viticola). Spring and early summer weather was moderately dry in coastal N.S.W. and downy mildew development was slight to moderate up till the end of December.

In Hunter R. (C.C.) vineyards the disease was well controlled by zineb, ziram, copper oxychloride and Bordeaux mixture up till the time of harvest. Rains commencing early in the New Year resulted in heavy development of downy mildew in unsprayed or poorly sprayed vines throughout the coastal grape areas. Weather conditions throughout February and March made it almost impossible to spray, but where Bordeaux mixture was applied good control was achieved. In the Murrumbidgee Irrigation Areas and mid Murray settlements (R) the weather throughout spring and summer was abnormally wet and good control of mildew was only achieved by those growers who sprayed regularly. At Orange (C.T.) and Molong (C.W.S.) also

seasonal conditions favoured the disease and up to 12 spray applications were made by some growers. Ziram and zineb gave excellent control. Downy mildew was reported from many home orchards in Western Slopes localities and from the North Western Plains section where it rarely occurs.

Very general development of downy mildew occurred towards the end of the season in all sections, resulting in defoliation of canes.

BLACK SPOT (Elsinoe ampelina) was well controlled by the use of Thiram or ziram and the only severe cases reported were from unsprayed vines in home gardens. Spring weather in the western parts of the State was unseasonably cool and wet and reports of extremely severe damage were received during November and December from home gardens in localities in the Central and North West Plains and North and Central and South West Slopes, where the disease is normally unknown. In a vineyard at Orchard Hills (M.A.) some infection was noted in January on vines which had been sprayed with zineb.

POWDERY MILDEW (Uncinula necator). The use of dithiocarbamate sprays which do not control powdery mildew have resulted in an increased development of the disease where sulphur was not used in addition. Quite severe attack was reported from Molong (C.W.S.), Koraleigh (R) and the Murrumbidgee Irrigation Areas.

FRUIT ROT (Botrytis cinerea and other moulds and yeasts). Rain prior to and at the time of harvest throughout the State resulted in the most disastrous losses of wine grapes and sultanas ever experienced by the industry. In the mid-Murray settlement of Koraleigh (R) 85-90% of the sultana crop was lost and in other settlements on the lower Murray (R) the losses were 75-80%. In the Murrumbidgee Irrigation Areas 9,000 tons of an estimated crop of 21,000 tons of wine grapes were lost and the later maturing, heavier skinned table grapes also suffered severely and only a very small proportion of the crop was harvested. In the Orange (C.T.) Molong (C.W.S) and Orchard Hills (M.A.) districts losses were somewhat less heavy.

In the Fairfield and Liverpool (M.A.) areas where some flooding occurred no grapes were harvested by most growers.

BUNCH STEM DIE BACK (Undetermined). Very slight development of this disorder occurred at Molong (C.W.S.) and Orange (C.T.). It was noted also in Black Muscat grapes at Orchard Hills (M.A.), Liverpool and Fairfield (M.A.).

BORDEAUX BURN (Copper toxicity). Very severe damage to vines of low vigour was observed in the Hunter River areas of Pokolbin, Mt. View and Branxton (C.C.), at Penrith (M.A.), Molong (C.W.S.), Orange (C.T.) and to a less extent at Orchard Hills (M.A). Where ziram or zineb were used in place of Bordeaux mixture no burning occurred.

SALT INJURY. Many vineyards in the Griffith (M.I.A.) area showed more salt damage than in previous years. Injury occurred in hitherto unaffected sections.

UNEVEN RIPENING OF BERRIES. This disorder was noted in Fairfield and Liverpool vineyards (M.A.) and to a less extent at Orchard Hills (M.A.).

HAIL DAMAGE. Hail storms of unusual intensity occurred particularly on the coast and in parts of the Murrumbidgee Irrigation Areas during summer. No complete figures of losses are available, but in individual vineyards in the Hunter R. and metropolitan area losses of up to one-third of the crop were sustained.

STRAWBERRY:

VIRUS DISEASES. Very prevalent.

LEAF DISEASES: LEAF SCORCH (Diplocarpon earliana), LEAF SPOT (Mycosphaerella fragareae) and LEAF BLIGHT (Dendrophoma obscurans) were prevalent in coastal and table-land areas.

GREY MOULD (Botrytis cinerea) caused considerable losses in the metropolitan area.

MAGNESIUM DEFICIENCY was reported from Berowra (M.A.).

BLACK ROOT ROT (Rhizoctonia solani) was recorded from Casula (M.A.) causing considerable losses during late spring.

OLIVE:

FRUIT ROT (Cercospora cladosporioides) caused considerable injury in a Turramurra (M.A.) plantation in spite of 4 Bordeaux sprays (Oct., Dec., Jan., Feb.).

RIPE ROT (Gloeosporium fructigenum) was reported from Parkes (C.W.S.) and the Sydney Metropolitan area.

LEAF SPOT (Cycloconium oleaginum) was observed at Cornwallis (M.A.).

ORNAMENTALS.

ASTER:

GREENING (Big bud virus) was reported from a number of areas including Dundas (M.A.) and Grenfell (S.W.S.). Unusual symptoms were observed on some plants.

AZALEA:

ROOT ROT (Rhizoctonia sp.) combined with poor lighting and high humidity caused the failure of many cuttings to produce roots during May this year at Kurrajong Heights (C.T.). Camellia cuttings were affected in the same way.

BEGONIA:

BACTERIAL LEAFSPOT (Xanthomonas begoniae) was recorded for the first time on Begonia tuberhybrida growing in glass-houses at Castle Hill (M.A.). The plants were second generation plants from seed originally imported from the United Kingdom. The original plants, however, were reported to be healthy. The disease spread rapidly through all the plants.

FOLIAR NEMATODES (Aphelenchoides olesistus) were reported on both Rex and Tuberous begonia plants in the Metropolitan Area causing heavy losses in nurseries. The infection appears as pale water soaked spots rapidly spreading over the whole leaf and eventually killing it.

BOOBIALLA (Myoporum montanum):

SCLEROTINIA ROT (Sclerotinia sclerotiorum) was recorded on this host for the first time in N.S.W. from Trangie (C.W.S.) where a number of trees were infected. This area had suffered an extremely wet autumn and winter with severe floods producing a favourable environment for the fungus.

CAMELLIA (C. SASANQUA):

ROOT ROT (Phytophthora cinnamomi) was reported from the Metropolitan Area on numerous varieties varying in age up to 12 years. The rot was particularly severe in poorly drained areas following the severe wet season.

LEAF GALL (Exobasidium camelliae) was reported again this year from the Metropolitan Area. Infection was moderately severe.

CHRYSANTHEMUM:

RAY BLIGHT (Ascochyta chrysanthemi) was severe on plants at East Kurrajong (C.T.). The weather conditions were wet and numbers of varieties were infected. The disease, however, does not appear to have been as prevalent in the Metropolitan Area this year.

COSMOS:

GREENING (Tomato big bud virus) was prevalent in plants growing at Inverell (N.W.S.). This virus was particularly prevalent this year infecting many plant species.

DAHLIA:

SCLEROTINIA ROT (Sclerotinia sclerotiorum) was recorded earlier than usual at Hyde Park (M.A.) infecting the stems of flowering plants. The humid wet weather is believed to have been responsible for the early discharge of ascospores and the many plants affected.

FELICIA ANGUSTIFOLIA:

ROOT ROT (Phytophthora sp.) was recorded for the first time in N.S.W. on plants at Liverpool (M.A.) where the disease first appeared causing dieback of the shoots followed by death of the whole plant.

FERNS:

FOLIAR NEMATODE (Aphelenchoides olesistus) was recorded for the first time in N.S.W. infecting a number of fern genera including Adiantum. The disease appears to be widespread in the Metropolitan Area and has probably been present for several years.

GALLARDIA:

GREENING (Tomato Big bud virus) was reported from Orchard Hills (M.A.) for the first time infecting this host plant.

GERANIUM (Pelargonium spp.)

BLACK ROT (Pythium splendens) was recorded for the first time at Wahroonga (M.A.) where it was stated to be causing severe loss of plants. The disease also occurred in other districts in the Metropolitan Area.

GREENING (Tomato Big bud virus) was reported causing loss of flowers at Wagga (S.W.S.).

LEAF AND STEM ROT (~~Xanthomonas pelargonii~~ PSEUD ERODII) was reported from Walgroonga (M.A.) infecting bedding geraniums.

GLADIOLUS:

ROOT ROT (Sclerotinia gladioli) heavily infected April plantings of corms at Haberfield (M.A.). Plants showed considerable tip burning and slowing down of growth. Corms planted in the same bed in the previous year appeared to be healthy.

IRIS (I. germanicus):

SOFT ROT (~~Pseudomonas~~ ERWINIA carotovorus A) caused severe losses to growers in the Pennant Hills district (M.A.).

LUPIN:

SHOOT BLIGHT (Broad bean wilt virus) caused 100% infection in blue lupins growing at Cooma (S.T.). Infection had continued from early growth stages but a few plants had reached the flowering stage before symptoms appeared. Second growth in most cases was poor or absent. Plants grown at Island Bend (S.T.) from the same seed showed no sign of infection.

MAPLE:

BLACK HEART (Verticillium alboatrum) was reported infecting Japanese maples at Five Dock (M.A.). This fungus eventually kills most of these trees.

OAK (Quercus virginiana):

ROOT ROT (Phytophthora cinnamomi) was responsible for the death of a number of live oaks in the Botanic Gardens and Centennial Park (M.A.). In the Gardens a number of trees, including one 70-80 years old, were killed. Only trees in very well drained areas of the Park survived, the majority of the trees however were attacked and killed.

PEACH -FLOWERING:

GREENING (Tomato big bud virus) was reported from Warren (C.W.P.). The infected trees developed few flowers while leaves and flowers were produced concurrently.

POLYANTHUS:

YELLOWS (Cucumber mosaic virus) was present on plants from Mt. Wilson (C.T.) causing premature ageing of older leaves and yellowing of young leaves without any mosaic symptoms. The virus was found to be a ringspot strain of cucumber mosaic. This has not previously been recorded on Polyanthus.

POPPY:

SHOOT BLIGHT (Broad bean wilt virus) was reported affecting 75% of various Shirley poppy types growing at Oberon (C.T.). A black streak developed on the stem and tip blight was present.

ROSE:

BLACK SPOT (Diplocarpon rosae) was reported causing severe infection on various varieties in gardens at Bourke (W.D.). The plants were growing under abnormally wet conditions which would have allowed the fungus to develop. The disease was widespread throughout the State.

WILT (Virus) was reported from West Kempsey (N.C.) and from the Sydney Metropolitan Area. The leaf development was poor with only a few small curled leaves present. New and chronic infections were prevalent during spring.

POWDERY MILDEW (Sphaerotheca pannosa) was well developed on susceptible plants in the Metropolitan Area during spring. The presence of this fungus was recorded earlier than usual this year.

SAXIFRAGE (Bergenia ligulata):

FOLIAR NEMATODE (Aphelenchoides olesistus) was recorded for the first time on this host.

VEGETABLES.

ASPARAGUS: No records.

BEAN, FRENCH:

BEAN SEED CERTIFICATION: In co-operation with the Division of Plant Industry, the Bean Seed Certification Scheme was continued for the thirteenth successive season. This year, rain and flood conditions caused the complete loss of many crops and severe damage to others. The estimated yield of certified seed was 2060 bushels, only a little over half last year's estimated yield of 3,695 bushels. This total was made up of 1,145 bushels of Brown Beauty (56%), 420 bushels of Hawkesbury Wonder (25.9%), and smaller quantities of other varieties. The total area certified was 445 acres.

Rejections this season were mainly because of excessive weed growth encouraged by the wet weather although 3 crops were rejected because of anthracnose and 1 because of halo blight. The total area rejected from certification was 120 acres.

ANTHRACNOSE (Colletotrichum lindemuthianum) In coastal bean crops, anthracnose was prevalent this season. In some cases, severe damage was caused in the field, and many consignments of beans arriving at the Sydney Municipal Markets continued to show pod spotting and subsequent rotting.

Testing work has continued on several generations of cross-bred material made available by Professor W.L. Waterhouse. Many different crosses have been made and tested but the main one used has been a cross of Hawkesbury Wonder X Westralia. The latter variety is resistant to all races of anthracnose and rust known in New South Wales and some very promising selections now in F4 and F5 have been made. These show good anthracnose resistance combined with good commercial qualities.

Work on strains of anthracnose present in New South Wales and other States is being carried out in conjunction with the testing work. Results recently published by Professor Waterhouse show the presence of at least eight races of anthracnose in New South Wales. At the Biological Branch, a collection of

isolates from different areas has been started and the races present identified on a differential set composed of local commercial varieties.

RUST (Uromyces phaseoli typica). During the winter of 1955, rust was again very severe in bean crops on the North Coast. An outbreak at Lismore (N.C.) was stated to be the most severe outbreak of bean rust on record. Rust was again severe in the autumn and much damage was caused but good control was obtained where zineb sprays were used. Several lines of beans planted at Hawkesbury Agricultural College for seed increase and field testing for rust were destroyed by floods.

HALO BLIGHT (Pseudomonas medicaginis var. phaseolicola) was recorded on bean crops grown for seed at Leeton (M.I.A.), on the South Coast and in the Sydney Metropolitan Area. The wet weather favoured the development and spread. It was also severe in irrigated beans at Wentworth during the autumn.

AMERICAN COMMON BLIGHT (Xanthomonas phaseoli) caused considerable damage to navy bean crops at Glen Innes (N.T.) during the wet autumn and was also severe in several lines at Hawkesbury Agricultural College (M.A.).

OTHER DISEASES Diseases favoured by the wet autumn were ANGULAR LEAF SPOT (Isariopsis griseola) which caused severe defoliation and pod spotting in many crops on the South Coast, BACTERIAL BROWN SPOT (Pseudomonas syringae) which damaged crops on the South Coast and at Wentworth (W.D.) and SCLEROTINIA STEM ROT (Selerotinia sclerotiorum).

BEAN, BROAD:

VASCULAR WILT (Broad bean vascular wilt virus). This disease was not so destructive on broad bean crops in the Sydney Metropolitan Area as during the 1954/55 season. However, a 100% infection was recorded in a crop at Oberon (C.T.) and the disease was also recorded at Medlow Bath (C.T.). The broad bean vascular wilt virus has now been recorded on a wide range of botanical species in the Sydney area and appears to be becoming established in tableland areas.

BEET AND SILVER BEET:

LEAF SPOT (Cercospora beticola). Prolonged periods of very wet weather in autumn favoured some severe infections of this disease in market gardens and home garden plantings in the Sydney metropolitan area.

BEET EELWORM (Heterodera schachtii). This parasite has, as far as is known, been confined to the one property at Milperra (M.A.) where it was recorded in 1953. No additional outbreaks have been recorded this year.

CARROT: No records.

CELERY:

LATE BLIGHT (Septoria apii-graveolentis). Moderate infections of this disease were recorded in a number of celery crops in the Sydney metropolitan area during the late autumn and early winter of 1956.

BACTERIAL SOFT ROT (Bacterium carotovorum). Wet conditions favoured the occurrence of bacterial soft rot of stalks in the field in a number of celery crops in the Sydney metropolitan area.

CRUCIFERS:

FLOOD DAMAGE. Extensive flood damage occurred to cauliflower plantings in the Windsor-Richmond area (M.A.) during the autumn. Seed beds and young crops were washed out, and, in a number of cases, planting this year had to be abandoned. In parts of this area not subject to actual flood, continued rain encouraged PHYTOPHTHORA STEM ROT (P. megasperma) and many plants were lost with this disease.

BLACK ROT (Xanthomonas campestris). This disease caused heavy damage in plantings of cabbage and cauliflower in the Clarence River area (N.C.) in autumn. Most crops in this area were affected to a greater or less extent. A number of records were also made during this period of these two hosts in the Sydney metropolitan area. Infections were also noted in crops in the Central Tablelands, Brussels sprouts being affected at Yetholme and a 70% infection occurring in a crop of Snowball cauliflower at Rockley.

BLACKLEG (Phoma lingam) was recorded for the first time in this State on brussels sprouts at Yetholme (C.T.). Infection was very light.

CLUB ROOT (Plasmodiophora brassicae). No records of this disease were made during the year, probably as a result of the depression of cauliflower production, due to adverse weather conditions, in those areas where the disease is known to occur.

Final assessment of results of a trial carried out at Richmond (M.A.) in the 1955 season, indicated quite clearly that dipping of roots of seedling transplants in a 4% calomel on talc slurry controlled severe club root and enabled the production of marketable heads by plants growing in infested soil.

WHITE LEAF SPOT (Cercosporella brassicae). This disease was recorded on Brussels sprouts for the first time in New South Wales at Yetholme (C.T.). A moderate leaf infection had occurred. A heavy infection also occurred on Chinese cabbage at Kenthurst (M.A.).

BLACK ROOT OF RADISH (Aphanomyces raphani). This disease was severe on a crop of a long rooted variety at Matraville (M.A.), a planting of globe type nearby being affected to a lesser extent. Black root was also recorded on radish at Terrey Hills (M.A.) during the year.

WHIPTAIL OF CAULIFLOWER (Molybdenum deficiency). This disease was of some importance in cauliflower crops on the Murrumbidgee Irrigation Areas this year. Although whiptail of cauliflower has not previously been recorded in this area, the responses obtained following the application of molybdenum to rockmelon crops on the M.I.A. were commented on in last year's report.

CUCURBITS:

FUSARIUM WILT OF ROCKMELON (F. oxysporum f.? melonis) No new outbreaks of this disease were recorded following the first record of fusarium wilt of rockmelon at Brookvale (M.A.) in 1955. A trial was carried out on the property concerned during the past season to test the field reaction of a number of early maturing rockmelon varieties to this disease. The results of the trial showed that the Bender's Surprise, Hales Best and P.M.R.45 varieties were very susceptible but the Delicious 51 variety bred at Cornell University, U.S.A., for resistance to the strain of F. oxysporum causing rockmelon

wilt in that country, was highly resistant to the disease at Brookvale. Some rotting of young seedlings of this latter variety was caused by the pathogen, this rotting being similar to that which sometimes occurs as the result of attack by the watermelon wilt pathogen (F. oxysporum f. niveum) on seedlings of wilt resistant watermelon varieties. Weather conditions during the early part of the trial were very adverse for rockmelon growth but when conditions became favourable, the plants of Delicious 51 grew very satisfactorily in the infested soil whereas plants of the other three varieties were practically all killed by the disease as the season progressed.

FUSARIUM WILT OF WATERMELON (F. oxysporum f. niveum). The widespread use of resistant varieties has led to very satisfactory control of this disease in New South Wales. However, a severe attack occurred in a crop of watermelons at Lismore (N.C.) in December, on a "local" North Coast strain of this plant.

YELLOWS (Molybdenum deficiency). This deficiency was again present in rockmelon crops on the Murrumbidgee Irrigation Areas. A general recommendation has been made for the application of molybdenum to rockmelon crops in this locality and trials carried out during the season showed very favourable responses to applications of this element to this crop on the M.I.A.

POWDERY MILDEW (Erysiphe cichoracearum) and DOWNY MILDEW (Pseudoperonospora cubensis). Conditions at Gosford Citrus Research Station (C.C.) were very favourable for the development of both mildews of cucurbits. In a plant breeding and varietal trial, the rockmelon varieties Granite State, Golden Delight, Delicious 51 and a seedling (Rio Sweet x 20534) were moderately to severely affected with both mildews. Delicious 51 was particularly susceptible to powdery mildew. The seedling P.M.R.45 x Weslaco Strain C (F_1) showed no powdery mildew infection and only slight to moderate downy mildew infection.

SCLEROTIUM ROT (S.rolfsii). This disease was recorded for the first time on rockmelon in New South Wales at Griffith (M.I.A.). The fungus had invaded the fruit and at least 75 crates of rockmelons from a two acre planting were affected.

EGGPLANT: No records.

LETTUCE:

SPOTTED WILT (Tomato Spotted Wilt Virus). As in the 1954/55 season, little loss was sustained through this disease, the only reported occurrence of any significance being at Dural (M.A.) where 10% infection of a $\frac{1}{2}$ acre crop had taken place.

MUSHROOM (Cultivated Strain):

Cultivated white mushrooms in the Sydney Metropolitan Area were generally free of disease and competitors. One case of TRUFFLE (Pseudobalsamia microspora) and one case of BUBBLES (Mycogone perniciosa) were recorded during the year. WHITE GILL (cause undetermined) was occasionally troublesome in later flushes. Some GREEN MOULD (Trichoderma sp.) was present in outdoor beds which had been exposed to wet conditions during composting in Autumn.

ONION: No records.

PARSLEY: No records.

PARSNIP:

CANKER AND LEAF SPOT (Itersonilia sp.) again caused severe damage to parsnips in market gardens at Matraville (M.A.). The fungus has been isolated from leaf spots on young plants and the disease on the roots may originate from spores produced on these spots and washed down onto the roots.

LEAF SPOT (Phleospora crescentium) caused moderate spotting of older parsnip leaves in a crop at Hamwood (M.I.A.). The disease was encouraged by wet weather but spread ceased during a dry spell.

PEA:

MYCOSPHAERELLA BLIGHT (M. pinodes), ASCOCHYTA LEAF SPOT (A. pisi) and ASCOCHYTA FOOTROT (A. pinodella). Mycosphaerella blight was prevalent as usual in coastal pea crops causing significant yield reductions in some cases. Ascochyta leaf spot was also present but was of lesser importance. Ascochyta footrot, a disease of minor importance in this State, was recorded on one occasion only during the year, at Lismore (N.C.).

FUSARIUM WILT (F. oxysporum f. pisi race 1) caused a 70% reduction in a crop at Ballingall (M.I.A.) in autumn. There were no other records of this disease.

SEPTORIA BLOTCH (Septoria pisi) caused moderate damage to a 10 acre crop of peas at Cargo (C.T.).

PEPPER (Capsicum): No records.

POTATO:

LATE BLIGHT (Phytophthora infestans). Coastal spring crops were unaffected by late blight although a trace of the disease was present in autumn coastal plantings.

The disease was of considerable importance, however, in the Tableland main crop, for the first time since the 1950/5 season. Crops on the tablelands were subject to practically continuous rain during the late summer and autumn period and conditions were generally ideal for infection and spread of late blight and negated most attempts at fungicidal control.

Potato crops at Guyra and Glen Innes (N.T.) were fairly well advanced when the disease appeared. Some crops, however, were completely destroyed. Losses resulting from tuber infection were not as high as was anticipated. Fine weather during April in this area allowed digging to be carried out.

Extensive infections occurred on crops in the Central Tablelands. In the Orange and Millthorpe districts, 25% of the crop was destroyed. Very susceptible varieties such as Aussie and Manhattan were a total loss. In other less susceptible varieties considerable reduction in tuber yield resulted from damage to the tops. Losses in the Mudgee area were relatively light.

Although the majority of crops in the Crookwell section of the Southern Tablelands were affected in March tuber infection was relatively light. However, in both this area and on the Central Tablelands waterlogged soils hampered digging and soft rot breakdown of tubers in the soil added to the losses caused by late blight.

In the Batlow area (S.T.) a combination of late blight and early blight (Alternaria solani) reduced the district yield by an estimated 1000 tons. Defoliation due to early blight was estimated at 30% overall.

VIRUS DISEASES: Records of certification inspections of tableland seed crops during the 1955/56 season indicated that no crop was rejected for the presence of excess LEAF ROLL, compared with rejection of only 0.22% of the total acreage submitted during the previous season. 1955/56 is the first season since the inception of the Potato Seed Certification Scheme that this disease has not been responsible for any crop rejections and indicates the high degree of freedom from leaf roll disease which has been obtained in certified seed, particularly in recent years. The incidence of MOSAIC DISEASES and SPOTTED WILT was also nil and that of PURPLE-TOP WILT (Tomato big bud virus) was negligible.

BLACKLEG (Bacterium carotovorum). There were some records of this disease in spring crops at Taree and Maitland (C.C.). At Taree, the disease occurred in trace amounts, and at Maitland the highest recorded loss was 1% in a crop of the more susceptible Sebago variety.

COMMON SCAB (Actinomyces scabies) caused insignificant losses as was the case during the previous season.

PINK ROT (Phytophthora spp.) was recorded during the year on crops at Hanging Rock (N.W.S.) and Wentworth Falls (C.T). Very wet conditions were experienced in both localities. At Hanging Rock where P. megasperma was recorded as the causal agent of pink rot of potato tubers for the first time in New South Wales in 1954, the disease was very destructive. At Wentworth Falls, an as yet unidentified species of Phytophthora wiped out the tubers in a small planting.

SILVER SCURF (Spondylocladium atrovirens). This disease is usually of minor importance in New South Wales although a few specimens of tubers showing considerable blemishing due to this disease were received during the year from Kempsey (N.C.) and from the Metropolitan Area. A small trial was carried out during the season to determine the reaction of locally grown varieties to the disease when planted in infested soil at West Pennant Hills (M.A.). The results showed that no worthwhile resistance existed among these varieties.

RHUBARB:

LEAF SPOT (Phyllosticta straminella) caused some damage to leaves of plants in home gardens during the wet autumn period in the Sydney Metropolitan Area.

SWEET POTATO: No records.

TOMATO:

YELLOW TOP (Virus) The name yellow top has been given to a disease previously recorded as "unidentified" in this Survey. It is now the most commonly occurring virus disease in coastal crops. During the year first records of its incidence in inland areas were made at Coonabarabran (N.W.P.), Bathurst (C.T.) and Tenterfield (N.T.) where it was present in a small number of plants in each case. On the coast infection ranged from trace to 100% in individual crops. The tendency for increased suppression of fruit set noted last year was still more obvious this season when most plants failed to set fruit subsequent to the appearance of symptoms.

SPOTTED WILT (Tomato spotted wilt virus). Trace infection only was recorded in all sections of the State with the exception of the Murrumbidgee Irrigation Areas where losses ranging from 10 to 50% were common in individual crops. These figures are considerably in excess of those recorded for the past several years in any area.

EARLY BLIGHT (Alternaria solani) caused serious defoliation in crops both on the coast and inland. This severity was a result of heavy and frequent rainfall. Mid-season crops in the Murrumbidgee Irrigation Areas were only lightly affected.

FUSARIUM WILT (Fusarium oxysporum f. lycopersici) caused less damage on the coast than usual but serious losses were reported on the Murrumbidgee Irrigation Areas where fully susceptible varieties are grown.

BACTERIAL SPOT (Xanthamonas vesicatoria)was again prevalent on the North Coast where several crops were defoliated. Only trace infections occurred in the Sydney Metropolitan Area and inland. On the North Coast no useful control was observed as the result of spraying with streptomycin plus terramycin on a field scale.

LEAF MOULD (Cladosporium fulvum) was prevalent in out-door crops as the result of continued high humidities in autumn. Little damage occurred except in isolated crops. As usual leaf mould was a major glasshouse disease.

BACTERIAL WILT (Pseudomonas solanacearum) caused severe damage during wet periods on the far north coast.

LATE BLIGHT (Phytophthora infestans) was widely distributed in glasshouses, nurseries and the field but caused little economic loss except in isolated cases and in one nursery where 30,000 plants were destroyed.

MISCELLANEOUS PLANTS.

ACACIA SPP.:

LEAF SPOT (Diplodia lichenopsis)was recorded on A. pycnantha, for the first time in N.S.W., from Tamworth (N.S.W.) This leafspot has been recorded previously on other species of Acacia.

GALL RUST (Uromycladium tepperianum) was recorded from Tottenham (C.W.P.) on A. doratoxylon (Currawong) killing out large numbers of mature specimens of these valuable fodder trees. The occurrence of the disease in this area is believed to have been due to an unusually damp autumn and winter following a series of wet seasons.

BRANCH CANKER (Physalospora acaciae) was widespread in the Sydney Metropolitan Area on A. baileyana.

BATHURST BURR (Xanthium spinosum):

ANTHRACNOSE (Colletotrichum xanthii) was recorded damaging the stem of young plants at Trundle (C.W.P.) and, during the wet autumn, numerous unidentified ROOT ROT DISEASES were present.

COBBLER'S PEGS (Bidens pilosa):

WILT (Broad bean wilt virus ?) was present on most plants in the Sydney Metropolitan Area and at North Kurrajong (C.T.) during the late summer and early autumn. Growth was distorted and stems roughened but seed setting did not seem to be adversely affected in most cases. Generally plants recovered as the weather became cooler.

PINUS RADIATA:

Many breakwind trees in the flood areas of the Hawkesbury R. have died, following prolonged periods of water-logging.

YELLOW WOOD SORREL (Oxalis corniculata):

LEAF SPOT (Phyllosticta sp.) was recorded on this host for the first time in New South Wales from Toongabbie (M.A.).

MISCELLANEOUS SPECIES:

ROOT ROT (Phytophthora cinnamomi) was responsible for the death of large numbers of native shrubs and some trees in undisturbed bushland in the Sydney Metropolitan Area, Kurrajong (C.T.) and Black Hill (C.C.) following record rains in February and March. Amongst the species affected are Syncarpia laurifolia, Woollsia pungens, Xanthosa pilosa, Trachymene billardieri, Pultenaea sp., Epacris purpurascens, Actinotes helianthi, Dodonaea triquetra, Astrotricha floccosa, Dillwynia spp., Daviesia spp., Acacia juniperina.

NEW PLANT DISEASES.

During the twelve months ending 30th June, 1956, the following diseases were recorded for the first time in New South Wales:-

Acacia doratoxylon (Currawong). Uromycladium tepperianum (Sacc.) McAlp. (Gall rust); Tottenham.

Acacia juniperina (Prickly wattle).- Phytophthora cinnamomi Rands (Root rot); Kurrajong.

Acacia pycnantha (Wattle). - Diplodia lichenopsis Cooke & Mass. (Leafspot). Tamworth.

Adiantum aethiopicum hort vars. (Maiden hair ferns).- Aphelenchoides olesistus Ritzema Bos. (Foliar nematode); Metropolitan area.

Agrostis sp. - Tilletia ?pallida Fischer (Smut); locality not known, found in seed sample.

Allium cepa (Onion). - Botrytis byssoidea J.C. Walker (Neck rot); Metropolitan area.

Anchusa italica. - Broad bean wilt virus; Metropolitan area, Oberon. Phytophthora sp.(Crown rot); Pennant Hills (Sydney Metropolitan area).

Asplenium bulbiferum (fern). - Aphelenchoides olesistus Ritzema Bos. (Foliar nematode); Metropolitan area.

Astrotricha floccosa. - Phytophthora cinnamomi Rands (Root rot); Wiseman's Ferry, Laughtondale.

Aquilegia vulgaris (Columbine). - Phytophthora sp.(Root Rot); Pennant Hills (Sydney Metropolitan Area).

Bassia quinquecuspis (Black roly poly). - Virus, (Rosette); Coonamble.

Begonia tuberhybrida (Begonia). - Xanthomonas begoniae (Buchw.) Dowson; Castle Hill (Sydney Metropolitan area).

Bergenia ligulata (Saxifrage). - Aphelenchoides olesistus Ritzema Bos. (Foliar nematode); Pennant Hills (Sydney Metropolitan area).

Blechnum cartilagineum (Blechnum fern). - Aphelenchoides olesistus Ritzema Bos. (Foliar nematode); Hornsby (Sydney Metropolitan area).

Brassica campestris (Wild turnip). - Cercosporella brassicae (Fautr. & Roum.) Hoehn. (White leafspot); Guyra.

B. oleracea gemifera (Brussels sprouts). - (1) Cercosporella brassicae (Fautr. & Roum.) Hoehn. (White leafspot) Bathurst; (2) Phoma lingam (Tode ex Fr.) Desm. (Blackleg); Bathurst.

Callitris columellaris.- Phytophthora sp. (Crown rot); Metropolitan area.

Carthamnus tinctorius (Safflower). - Sclerotinia sp. (Stem rot); Spring Ridge.

Cassia eriobotrya.- Armillaria mellea (Vahl ex Fr.) Quel. (Armillaria root rot); Sydney Botanic Gardens (Sydney Metropolitan area).

Cassine mauroceina.- Armillaria mellea (Vahl ex Fr.) Quel. (Armillaria root rot); Sydney Botanic Gardens (Sydney Metropolitan area).

Cheiranthus allioni (Wallflower). - Plasmodiophora brassici Woron. (Clubroot); Metropolitan area.

Cheiranthus cheiri (Wallflower). - Sclerotinia sclerotiorum (Lib.) de Bary (Stem rot); Metropolitan area.

Chrysanthemum frutescens (Marguerite). - Phytophthora sp. (Root rot); Pennant Hills (Sydney Metropolitan area).

Cistus ladaniferus. Phytophthora sp. (Root rot); Pennant Hills (Sydney Metropolitan area.)

Citrus limon (Rough lemon). - Sclerotium rolfsii (Sacc.) (Collar rot); Maroota.

Conospermum longifolium. - Phytophthora cinnamomi Rands (Root rot); Kurrajong.

Cosmos bipinnatus (Cosmos). - Tomato big bud virus (Greening); Inverell.

Cucumis melo (Rockmelon). - Corticium rolfsii (Sacc.) Curzi; (Fruit rot); Griffith, M.I.A.

Dahlia variabilis (Dahlia). - Phytophthora sp. (Collar rot); Pennant Hills (Sydney Metropolitan area).

Daviesia ulicifolia, D. squarrosa. - Phytophthora cinnamomi Rands (Root rot); Black Hill.

Dianthus plumarius (Dianthus). - Broad bean wilt virus (Shoot blight); Metropolitan area.

Digitalia purpurea (Foxglove). - Broad bean wilt virus; Metropolitan area; Phytophthora sp. (Root rot); Pennant Hills (Sydney Metropolitan area).

Dillwynia ericifolia, D. floribunda.- Phytophthora cinnamomi Rands (Root rot); Kurrajong.

Dimorphotheca sp. (Cape marigold). - Phytophthora sp. (Root rot); Pennant Hills (Sydney Metropolitan area).

Dodonaea triquetra (Hop bush). - Phytophthora cinnamomi Rands (Root rot); Palm Beach (Sydney Metropolitan area).

Echeveria sp.- Phytophthora sp. (Stem rot); Cheltenham (Sydney Metropolitan area).

Echium plantagineum (Paterson's Curse). - Linear fasciation (non-parasitic); Armidale.

Epacris purpurascens. - Phytophthora cinnamomi Rands (Root rot); Pennant Hills (Sydney Metropolitan area).

Exochorda grandiflora (Pearl bush). - Broad bean wilt virus; Metropolitan area,.

Gaillardia aristata (Gaillardia). - Tomato big bud virus (Greening); Orchard Hills.

Gnaphalium purpureum (Cudweed). - Albugo sp. (White rust) Richmond.

Grevillea banksiae.- Amphichaeta grevilleae Loos. (Leafspot); Metropolitan area,.

Grevillea buxifolia.- Phytophthora cinnamomi Rands (Root rot); Kurrajong.

Grevillea robusta (Silky oak). - Amphichaeta grevilleae Loos (Leafspot); Metropolitan area.

Hakea dactyloides.- Phytophthora cinnamomi Rands (Root rot); Kurrajong.

Helenium autumnale. - Broad bean wilt virus (Shoot blight); Pennant Hills (Sydney Metropolitan area).

Leycesteria formosa. Phytophthora cinnamomi Rands (Root rot); Pennant Hills (Sydney Metropolitan area).

Lupinus sp. - Corticium rolfsii (Sacc.) Curzi (Stem rot); Peakhurst (Sydney Metropolitan area.)

Lycopersicum esculentum (Tomato). - Fasciation, non-parasitic; Richmond.

Malus sylvestris (Apple). - (1) Apple mosaic virus; General, particularly on Jonathan (old record); (2) Flat limb (suspected virus); General on Gravenstein (old record); (3) Green crinkle virus; Uralla, Orange, 1955, on Granny Smith; (4) Thumb mark virus; Batlow, Oakdale, on Granny Smith.

Matthiola incanis (Stock). - Phytophthora sp. (Root rot); Wyong.

Medicago sativa (Lucerne). - Phytophthora sp. (Root rot); Woodstock.

Myoporum montanum (Boobialla). - Sclerotinia sp. (Sclerotinia root rot); Trangie.

Narcissus jonquilla (Jonquil). - Chocolate spot virus; Wyong.

Oxalis corniculatus (Yellow wood sorrel). Phyllosticta sp. (Leafspot); Toongabbie (Sydney Metropolitan area).

Oxylobium trilobatum. Phytophthora cinnamomi Rands (Root rot); Upper Colo.

Panicum fulgidum - Phyllachora sp. (Leafspot); Woy Woy.

Papaver rhoeas (Poppy). - Broad bean wilt virus (shoot blight); Oberon.

Pelargonium hortorum (Garden geranium). - Pythium splendens (Black rot); Metropolitan area; Pseudomonas erodii Lewis (Leafspot); Sydney Metropolitan area.

Penstemon gloxiniodes (Penstemon). - Phytophthora sp. (Root rot); Pennant Hills (Sydney Metropolitan area).

Petrophila fucifolia (Drum stick). - Phytophthora cinnamomi Rands (Root rot); Pennant Hills (Sydney Metropolitan area).

Phalaris canariensis (Canary grass). - Erysiphe graminis DC. (Oidium stage) (Powdery mildew); Spring Ridge.

Phalaris tuberosa (Phalaris). - Claviceps sp. (Ergot); Locality not known, found in seed samples.

Phyllocactus sp. - Aphelenchoides olesistus Ritzema Bos. (Foliar nematode); Metropolitan area.

Poa sp.(Snow grass); Tilletia sp. (Bunt); Cathcart (1940 collection).

Primula polyantha (Polyantha). - Cucumber mosaic virus; Mt. Wilson.

Prostanthera lasianthos. - Phytophthora sp. (Root rot); Pennant Hills (Sydney Metropolitan area).

Prunus armeniaca (Apricot). - Stereum purpureum (Pers. ex Fr.) Fr. (Silver leaf); Kurrajong.

P. cerasus (Cherry). - (1) Tatter leaf virus; Orange, 1953, probably widespread; (2) raspleaf (? suspected virus); Orange, 1953, probably widespread.

P. domestica (Plum). - Plum line patterr mosaic virus; general on coast (old record.)

P. japonica (Flowering plum). - Corticium salmonicolor Berk. & Br. (Pink wood rot); Metropolitan area.

P. persica (Peach). - (1) Stereum purpureum (Pers. ex Fr.) Fr. (Silver leaf); Beecroft (Sydney Metropolitan area) 1952. (2) Peach rosette mosaic virus; Orange; 1953 (on J.H. Hale); (3) Peach ? Western X virus; 1952 Leeton. (4) Leptothyrium pomi Colby (Flyspeck, on twigs); West Pennant Hills (Sydney Metropolitan area).

P. persica var. nectarina (Nectarine). - Peach rosette mosaic virus; Orange, 1953 (on Goldmine).

Pultenaea sp. - Phytophthora cinnamomi Rands (Root Rot); Pennant Hills (Sydney Metropolitan Area), Kurrajong.

Pyrus communis (Pear). - (1) Stony pit virus; Lakesland 1950, Orange 1952, on Packham's Triumph, Williams, Howell, Beurre Bosc; (2) pear ringworm (suspected virus); Orange, on Packham's Triumph.

Quercus agifolia, Q. virginiana (Live oaks). - Phytophthora cinnamomi Rands (Root rot); Sydney Botanic Gardens, Centennial Park(Sydney Metropolitan Area).

Ranunculus asiaticus (Ranunculus). - Tomato big bud virus (Greening); Metropolitan Area.

Santolina chamaecyparissus (Lavender cotton) - Phytophthora sp. (Root rot); Pennant Hills (Sydney Metropolitan Area)/

Solanum triflorum (Three flowered nightshade). - Tomato big bud virus; Coonabarabran.

S. tuberosum (Potato). - Phytophthora sp. (Pink rot); Wentworth Falls; Pennant Hills (Sydney Metropolitan Area).

Sonchus oleraceus (Milk thistle). - Macrophomina phaseoli (Maubl.) Ashby (Stem rot); Peakhurst (Sydney Metropolitan Area).

Stachys lanata (Lamb's ear). - Corticium rolfsii (Sacc.) Curzi (Crown rot); Pennant Hills (Sydney Metropolitan Area).

Syncarpia laurifolia (Turpentine). - Phtophthora cinnamomi Rands (Root rot); Kulnura.

Syringa vulgaris (Lilac). - Broad bean wilt virus (Dieback) Metropolitan Area.

Trachymene billardieri. - Phytophthora cinnamom Rands (Root rot); Pennant Hills (Sydney Metropolitan area).

Trifolium incarnatum (Crimson clover). - Uromyces trifolii (Hedw.f) Lev. (Rust); Taree; Sclerotinia sp. (Rot); Leeton.

Trifolium pratense (Red clover). - Sclerotinia sp (Rot); Upper Orara, Deniliquin; Mycosphaerella carinthiaca Jaap. (Mid vein spot); Oberon; Sphaerulina trifolii Rostr. (Leaf spot) Glen Innes; Rugose leaf curl virus; Grafton; Stagonospora recedens (Mass al). Jones & Weiner (Leaf spot); Oberon; Tomato big bud virus (greening); Glen Innes, Oberon.

T. repens (White clover). - Sclerotinia sp. (Rot); Upper Orara, Deniliquin; Sphaerulina trifolii Rostr. (Leaf and petiole spot); Deniliquin.

T. subterraneum (Sub clover). - Kabatiella caulivora (Kirchn.) Karak. (Scorch or northern anthracnose); Berrigan; Sphaerulina trifolii Rostr. (Burn); Walcha.

Vicia atropurpurea (Purple vetch). - Broad bean wilt virus (shoot blight); Metropolitan Area.

Weigela rosea. - Phytophthora sp. (Root rot); Glenorie.

Woollsia pungens.- Phytophthora cinnamomi Rands (Root rot); Pennant Hills (Sydney Metropolitan Area).

Xanthosia pilosa. - Phytophthora cinnamomi Rands (Root rot); Pennant Hills.

Zantedeschia aethiopica (Arum lily). - Cercospora richardiaecola Atkinson (Leafspot); Wyong.